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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/920,003	07/31/2001	Kathrin Berkner	74451.P125	7171

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EXAMINER

TUCKER, WESLEY J

ART UNIT PAPER NUMBER

2623

DATE MAILED: 04/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/920,003

Applicant(s)

BERKNER ET AL.

Examiner

Wes Tucker

Art Unit

2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-103 is/are pending in the application.
- 4a) Of the above claim(s) 77-103 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-76 is/are rejected.
- 7) ☒ Claim(s) 15-34,55-62,75 and 76 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 July 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of claims 1-76 in the reply filed on October 18<sup>th</sup> 2004 is acknowledged. Applicant has canceled claims 77-103. Claims 1-76 are pending.

### ***Drawings***

New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because drawings are suitable for publication. Some of the submitted drawings are informal and contain handwritten annotation. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 5, 8, 11, 12, 13, 36-44, 47, 50-53, 63, 64, 67, and 70-73 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Application Publication No. US 2002/0003905 to Sato et al.

With regard to claim 1, Sato discloses a method comprising characterizing quantization noise in reconstructed data generated in response to application of an inverse wavelet transform (Fig. 11, S1303 and S1304 and paragraph 0110); and

removing the quantization noise from the reconstructed data constructed during decoding (paragraph 0111 and Fig.11, S1306).

Sato discloses calculating a noise amount and then sets a threshold for decoding to a certain bit plane and then removes noise accordingly by setting the transform coefficients to zero below the threshold.

With regard to claim 2, Sato discloses the method defined in claim 1 wherein removing noise comprises performing wavelet denoising using an enhancement wavelet transform (Fig. 11, 1305 and 1306 and paragraph 0111).

With regard to claim 5, Sato discloses the method defined in Claim 2 wherein performing wavelet denoising comprises applying the enhancement wavelet transform on a subset of all decomposition levels to which the inverse transform is to be applied (paragraph 0111). The LL subband is considered a subset of decomposition levels of the image to which denoising is applied.

With regard to claim 8, Sato discloses that the inverse wavelet transform takes place in a JPEG 2000 encoder (paragraph 0082).

With regard to claim 11, Sato discloses the method defined in Claim 1 wherein the quantization noise depends on quantization performed and the inverse wavelet transform applied (paragraphs 0006 and 0110). Sato discloses that the quantization noise is calculated in the decoder so it must depend on the inverse wavelet transform applied.

With regard to claim 12, Sato discloses the method defined in Claim 1 further comprising:

decoding image data, including applying the inverse wavelet transform to compression wavelet transform coefficients at level L to generate samples at enhancement wavelet transform level L-1 having quantization noise (paragraph 0111). Sato discloses applying inverse wavelet transforms to multiple levels.

With regard to claim 13, Sato discloses the method defined in Claim 12 further comprising repeatedly applying the inverse wavelet transform and removing quantization noise after each application of the inverse wavelet transform (paragraphs 0120-0124). The quantization noise is removed for multiple subbands each time they are decoded.

With regard to claim 36, Sato discloses the method defined in Claim 1 wherein the quantization noise is not uniformly distributed throughout the reconstructed data (paragraph 0111 and Fig. 11). It is understood that the quantization noise is not distributed uniformly throughout the reconstructed data because it is removed by filtering only certain subbands.

With regard to claim 37, Sato discloses the method defined in Claim 1 wherein the quantization noise is not continuous throughout the reconstructed data (paragraph 0111 and Fig. 11). It is understood that the quantization noise is not continuous throughout the reconstructed data because it is removed by filtering only certain subbands.

With regard to claim 38, Sato discloses the method defined in Claim 1 wherein the quantization noise has discrete values (Fig. 2). The quantization noise as characterized is considered discrete as the noise is calculated after a discrete wavelet transform.

With regard to claim 39, Sato discloses the method defined in Claim 1 wherein the quantization noise has rational values (paragraph 0121).

With regard to claim 40, Sato discloses the method defined in Claim 39 wherein the inverse wavelet transform is applied using a rational wavelet filter (paragraph 0111). Here a rational wavelet filter is interpreted as the method of setting coefficients to zero.

With regard to claim 41, Sato discloses the method defined in Claim 1 wherein characterizing quantization noise comprises characterizing scalar quantization of wavelet coefficients (paragraphs 0110 and 0111).

With regard to claim 42, Sato discloses the method defined in Claim 1 wherein the quantization noise is scalar quantization noise (paragraphs 0110 and 0111).

With regard to claim 43, Sato discloses a decoder comprising:  
an inverse wavelet filter unit to apply an inverse wavelet transform (Fig. 11, S1308);  
a quantization noise characterization unit to characterize quantization noise in reconstructed data generated in response to application of the inverse wavelet transform (Fig. 11, S1303 and S1304 and paragraph 0110); and  
a quantization noise removal unit to remove the quantization noise from the reconstructed data constructed during decoding (paragraph 0111 and Fig.11, S1306).

With regard to claim 44, Sato discloses the decoder defined in Claim 43 wherein the quantization noise removal block comprises a denoising unit to perform wavelet

denoising using an enhancement wavelet transform (paragraph 0111 and Fig.11, S1306).

With regard to claim 47, Sato discloses the decoder defined in Claim 44 wherein performing wavelet denoising comprises applying the enhancement wavelet transform on a subset of all decomposition levels to which the inverse transform is to be applied (paragraph 0111). The LL subband is considered a subset of decomposition levels of the image to which denoising is applied.

With regard to claim 50, Sato discloses the method defined in Claim 44 wherein the inverse wavelet transform is part of a JPEG 2000 decoder and is applied as part of using the decoder on a JPEG 2000 codestream (paragraph 0082).

With regard to claim 51, Sato discloses the decoder defined in Claim 43 wherein the quantization noise depends on quantization performed and the inverse wavelet transform applied (paragraphs 0006 and 0110). Sato discloses that the quantization noise is calculated in the decoder so it must depend on the inverse wavelet transform applied.

With regard to claim 52, Sato discloses the decoder defined in Claim 43 wherein the inverse wavelet filter unit applies the inverse wavelet transform to compression wavelet coefficients at level L to generate samples at the enhancement wavelet



transform level L-1 having quantization noise (paragraph 0111). Sato discloses applying inverse wavelet transforms to multiple levels.

With regard to claim 53, Sato discloses the decoder defined in Claim 51 wherein the inverse transform unit repeatedly applies the inverse wavelet transform and the quantization noise removal unit removes quantization noise after each application of the inverse wavelet transform (paragraphs 0120-0124). The quantization noise is considered to be removed for multiple subbands each time they are decoded.

With regard to claim 63, the discussion of claim 43 applies. Sato discloses an article of manufacture comprising one or more recordable media with executable instructions stored thereon which, when executed by a system (Fig. 1). The diagram in Fig. 1 is interpreted to be performed by a computer product to perform the steps discussed in regard to claim 43.

With regard to claim 64, the discussion of claim 44 applies.

With regard to claim 67, the discussion of claim 46 applies.

With regard to claim 70 the discussion of claim 50 applies.

With regard to claim 71, the discussion of claim 51 applies.

With regard to claim 72, the discussion of claim 52 applies.

With regard to claim 73, the discussion of claim 53 applies.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 4, 6, 7, 9, 10, 14, 35, 45, 46, 48, 49, 54, 65, 66, 68, 69 and 74 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. US 2002/0003905 to Sato et al.

With regard to claims 3 and 4 Sato discloses the method defined in claim 2 (Fig. 11, 1305 and 1306 and paragraph 0111), but does not disclose whether the enhancement wavelet transform is either a different transform than the inverse wavelet transform or the same as the inverse wavelet transform. Official notice is taken that many different wavelet transforms are well known in the art to be used according to experimentation and need. Therefore it would have been obvious to one of ordinary

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skill in the art at the time of invention to use any wavelet transform as a matter of design choice chosen through the process of routine experimentation according to desired effect.

With regard to claims 6 and 7, Sato discloses the method defined in Claim 5, but chooses to omit the details of which subsets of decomposition levels comprise a set of consecutive or non-consecutive decomposition levels. Official notice is taken that the details of wavelet denoising on different decomposition levels in both consecutive and nonconsecutive levels is well known in the art. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use any consecutive or non-consecutive decomposition levels as a matter of design choice chosen through the process of routine experimentation according to desired effect.

With regard to claim 9, Sato discloses the method defined in Claim 2, but omits the details of wherein performing wavelet denoising comprises controlling denoising using level 2 enhancement wavelet transform coefficients. However official notice is taken that many levels for enhancement are well known in the art of wavelet denoising according to desired effect. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use any advantageous level be chosen due to routine experimentation to achieve a desired result.

With regard to claim 10, the discussion of claim 9 applies.

With regard to claim 14, Sato discloses the method defined in Claim 1, but does not disclose further performing a deblurring operation on the reconstructed samples to enhance sharpness of an image. Official notice is taken that deblurring operations to increase sharpness are well known in the art to be used to sharpen images to make them more appealing. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use a deblurring operation in order to increase sharpness for a more appealing image.

With regard to claim 35, Sato discloses the method defined in Claim 1 wherein characterizing quantization noise comprises computing differences between neighboring samples. Official notice is taken that it is well known in the art to calculate quantization noise or any type of noise for that matter by computing differences between image components in order to obtain the values that are out of place i.e. noise values. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to characterize quantization noise by computing differences between neighboring samples in order to obtain values that are out of place and are deemed to be noise.

With regard to claims 45 and 46, the discussion of claims 3 and 4 applies.

With regard to claims 48 and 49 the discussion of claims 6 and 7 applies.

With regard to claim 54, the discussion of claim 14 applies.

With regard to claims 65 and 66, the discussions of claims 3, 4, 45 and 46 apply.

With regard to claims 68 and 69 the discussion of claims 6, 7, 48 and 49 apply.

With regard to claim 74, the discussion of claims 14 and 54 apply.

### ***Allowable Subject Matter***

Claims 15-34, 55-62 and 75-76 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wes Tucker whose telephone number is 571-272-7427. The examiner can normally be reached on 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 571-272-7414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wes Tucker

4-15-05

  
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